

CERAMIC COMPOSITIONS FOR LOW CONDUCTIVITY THERMAL BARRIER
COATINGS

ABSTRACT

[0037] Zirconia-containing ceramic compositions having a c/a ratio of the zirconia lattice in the range of from about 1.005 to about 1.016. These compositions comprise a stabilizing amount up to about 10 mole % of the composition of a stabilizer component which comprises: (1) a first metal oxide selected from the group consisting of yttria, calcia, ceria, scandia, magnesia, india and mixtures thereof in an amount of from about 1.5 to about 6 mole % of the composition of; (2) a second metal oxide selected from the group consisting of lanthana, neodymia and mixtures thereof in an amount of from about 0.5 to about 4 mole % of the composition; and (3) optionally ytterbia in an amount of from about 0.5 to about 4 mole % of the composition. These compositions further comprise hafnia in an amount of from about 0.5 to about 15 mole % of the composition; and optionally tantalum in an amount of from about 0.5 to about 1.5 mole % of the composition. These compositions are useful in preparing thermal barrier coatings having a balance of reduced thermal conductivity with good producibility, spallation resistance and erosion/impact resistance for an underlying substrate of articles that operate at, or are exposed to, high temperatures.